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A REVISION OF THE GENUS *SONOMA* CASEY (COLEOPTERA: PSELAPHIDAE)

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INTRODUCTION

The genus *Sonoma* is a particularly interesting group of North American pselaphids intimately associated with the Pacific Coast fauna. It was first recognized and described as a distinct genus by Thomas Casey (1886) to include two species previously placed in *Faronus* by John LeConte (1850, 1852). Casey (1887) proposed two new species from California and included *Euplectus parviceps* Mäklin (1852). Four additional species were described by Casey (1893) in the last complete revision up to the present time.

Consequently, in the last half century this predominantly Western North American genus has been decidedly neglected with the possible exceptions of such diagnostic compilations as Raffray (1908), Bowman (1934), and faunistic studies by Jeannel (1949), and Park (1953, 1961) in which the higher categories pertaining to *Sonoma* and its relations were reclassified and placed in a modern frame of reference.

The privilege of examining specimens of *Sonoma* belonging to the United States National Museum, the California Insect Survey of the University of California at Berkeley, the University of California at Davis, and the collection of Orlando Park is gratefully acknowledged, as well as the help of many individuals, who during the past seven years have placed numerous specimens at the authors' disposal. Special mention should be made of J. R. Helfer, E. E. Gilbert, V. D. Roth and D. J. Burdick, all of whom have contributed considerable time and effort in obtaining specimens from Berlese samples, and who have discovered species which otherwise would have remained unknown.

COLLECTION METHODS

Members of this genus have been collected primarily from the upper layers of soil and surface litter, particularly rotting logs, by using Berlese

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funnels. Many of the species possess functional wings, and it is possible that some specimens may have been taken by light trap.

The most satisfactory method used by us has been the collection of litter in heavy paper bags which are tied closed and brought to the laboratory for processing. Sixteen-inch square funnels of the type described by Newell (1955) with window screen inserted above the hardware cloth at the bottom of the hopper with a 100 watt bulb above will process one-third cubic foot of material each in four to eight hours. If need be, this time can be reduced considerably by occasionally removing the top layer of the sample. Specimens are collected in, and temporarily stored in, 95% ethanol.

PREPARATION FOR STUDY

Whenever a sufficient series is available, both conventional point-mounts and slide-mounts were prepared. Many of the characters useful in the differentiation of species can only be appreciated by observation with a compound microscope, while others, such as the foveation, can be observed best on pointed specimens. Slide-mounted specimens are first cleared in warm lacto-phenol, dissected in a drop of Hoyer's, dehydrated, and mounted in balsam. It has been our experience that the Hoyer's has a tendency to crystallize in time, possibly because lacto-phenol is carried over in the specimen from the clearing process, or possibly a perversity of the medium inherent in thick preparations. However, Hoyer's remains the best medium for study preparations as it dries slowly, and small anatomical parts can be easily manipulated with dissecting tools. *Minuten nadeln* in pin chucks are adequate instruments for gross dissection.

DISTRIBUTION

This genus is found in the coastal area of North America from Alaska to Southern California.¹ However, in the Pacific Northwest, the genus is not entirely restricted to the coast, and in California it may occur rarely in the Sierra.

Most of the species and the largest concentration of individuals seem to inhabit the moister situations within the coastal ranges and are found in isolated areas near permanent moisture south of the Transverse Range in California.

MORPHOLOGY

The genus may be recognized by the following characters. The head has a frontal fovea that does not obviously extend between the antennal bases. There are two smaller vertexal foveae located approximately on a line with the rear margin of the eyes. The eyes are well developed and easily visible from above. In addition to the normal complement of small setae there are two long recurved pairs, one near the front margin of the eyes and one on the tempora. Two pairs of minute tubercles are usually visible, one pair near the frontal fovea, the other pair near the neck. The neck has a single

¹ One species, *S. tolulae* (LeConte), occurs in the Southeastern United States.

row of monaxial setae originating at the sides and extending to the ventral surface. The antennae have eleven segments with segment three the smallest. The distal segments are gradually enlarged forming a feeble, loose club. All of the segments except the third bear a few long recurved setae as well as the normal complement of smaller setae which are directed obliquely forward. The maxillary palpi have four segments, the third bearing one longer seta and the fourth a blunt palpal cone. The pronotum has two bastolateral foveae and a basal sulcus with one large fovea at the middle and two minute foveae at the lateral ends of the sulcus posterior to the median fovea. Two discal foveae may or may not be present. Faint sulci may extend from the discal foveae to the foveae at the lateral limits of the basal sulcus. The pronotal disc is never medially longitudinally sulcate. The basal lateral margin may be weakly crenulate. Three pairs of the longer recurved setae usually occur on the pronotum. The elytra are about as long as wide. Sutural striae are present and complete, but subhumeral fovea or sulci are lacking. There are two obscure antebasal foveae and a varying number of foveae occur on the sutural and on the two discal striae. Some recurved setae are usually present. The abdomen has five visible tergites in both sexes, the first four laterally margined. The first visible tergite usually has a thin, transverse spongiöse strip. Recurved setae occur on all of the tergites except the first when the spongiöse strip is present, and on all lateral margins except the fourth. The venter of the female has seven normal sternites although the sixth may be asymmetric. The venter of the male has eight apparent sternites; six normal, the seventh a penial plate or capsule, and the eighth a small part of another plate covering the left side of the penial plate. The mesocoxal cavities are separated by processes of the meso- and metasterna; the metacoxae are contiguous. The male metatibia may have a secondary sexual modification on its inner surface near the apex. The tarsi bear two equal claws. The aedeagi of the males are approximately as broad as long, asymmetric, with the parameres setate or tuberculate.

TAXONOMY

Type-species. *Sonoma corticina* Casey (fixed by Bowman, 1934).

Sonoma repanda Marsh and Schuster, new species

(FIGS. 1, 2)

Male. Head 0.246 mm. long x 0.328 mm. wide; pronotum 0.369 mm. x 0.410 mm.; elytra 0.385 mm. x 0.541 mm.; abdomen 0.672 mm. x 0.657 mm.; total length 1.68 mm.

Brown. Head wider than long; eyes of moderate size, of about 20 coarse facets, scarcely projecting from the head; frontal margin of eyes 2/5ths from front of head; median fovea extending beyond middle of eyes (past vertexal foveae in slide-mounts); vertexal foveae separated by distance between fovea and eye, located slightly behind posterior margin of eyes; tempora evenly rounded; mandibular rami with about 14 small teeth. Pronotum wider than long, widest at middle, rounded to apical angle, arcuate to base; median fovea located anterior to basal lateral foveae; antebasal sulcus extends posteriorly to 2 minute foveae near the basal lateral foveae; discal punctures absent; brachypterous. Elytra with 2 foveae on sutural stria, 1 on the inner stria, 2 on the outer. Metatrochanter with inner margin evenly rounded in outline. Metatibia lacking obvious structures; each tibia terminating in a small

spine. Abdomen with 6 long recurved setae on the first visible tergite, 8 on the second and third, 6 on the fourth, and 1 on each margin except the fourth; the first visible tergite lacks a pilose strip; sternites 2 through 4 with a fovea at each anterior-lateral margin; apex of venter asymmetric. Aedeagus as illustrated (Fig. 2).

Female resembles the male except: eyes slightly smaller; sixth sternite symmetric; seventh simple, non-capsulate with 2 apical pairs of elongate setae.

The holotype male, four male and four female paratypes were collected at Stevens Creek Reservoir, seven miles N.W. of San Jose, Santa Clara County, California by D. J. Burdick on November 15, 1953. Specimens not included in the type series are females collected at Boulder Creek, Santa Cruz County, California, January 22, 1955, D. J. Burdick; and Big Basin, Santa Cruz County, December 23, 1953, V. D. Roth.

The holotype is deposited in the California Academy of Sciences, paratypes in the California Insect Survey and the collection of the authors.

In this species and the following three, the pronotum is devoid of discal foveae and the pubescent strips on the first visible tergite are lacking. These four species differ primarily on the basis of the males, the aedeagi of which, although distinct from each other, share several characters which tend to set them apart from other species in the genus. The setation of the paramere forms a dense brush around the apex. The left paramere has a characteristic elongated process which is absent from the right. Furthermore, the asymmetric median lobe is highly developed and is more strongly contorted than it is in the other species groups.

The females are presently recognized only by association with the males.

This species is restricted to the Santa Cruz Mountains of California south of San Francisco Bay.

Sonoma spadica Marsh and Schuster, new species

(FIG. 3)

Male. Head 0.246 mm. long x 0.328 mm. wide; pronotum 0.344 mm. x 0.385 mm.; elytra 0.385 mm. x 0.492 mm.; abdomen 0.648 mm. x 0.558 mm.; total length 1.68 mm.

Dark brown. Head wider than long; eyes moderately large, of 18 facets; median fovea deep, constricted posteriorly to form a "T"-shaped cavity, extending to middle of eyes (not extending beyond posterior margin of eyes in slide-mounts); vertexal foveae separated by the distance from fovea to eye, located behind posterior margin of eyes; tempora evenly rounded. Pronotum wider than long, widest at middle, nearly straight to apical angle, arcuate to basal angle; disc not foveate; brachypterous. Elytra with 3 foveae on sutural stria, 2 on inner discal, and 3 on outer stria. Abdomen with some long, recurved setae on all visible tergites and on all margins except the last. Metatrochanter with inner margin evenly rounded in outline. Metatibia not modified; apices of all tibia with at least 1 large spine. Aedeagus as illustrated (Fig. 3).

Female resembles the male except: eyes slightly smaller, sixth sternite simple, transverse margin not arcuate, the seventh sternite broadly pentagonal.

The holotype male, three male and three female paratypes were collected by J. R. Helfer as follows: one male, July 15, 1954, holotype male July 18, 1954, one female November 1, 1954, at Mendocino, Mendocino County, California, and two females August 18, 1957, one male August 27, 1954, at Comptche, Mendocino County, California. Three males and one female not included at Mt. Saint Helena, Napa County, California on

April 23, 1957 by S. F. Bailey. One additional female was collected at the same locality February 3, 1959 by R. O. Schuster.

This species is closely allied to *S. repanda*, the males differing primarily in the configuration of the aedeagus. However, *S. spadica* has a tendency to become bicolored with the elytra red-brown and the rest of the body a dark brown. Also, the frontal fovea is constricted forming a "T"-shaped depression, and the elytra are obviously longer than the pronotum but equal to the pronotal width.

The type locality of this species is Mendocino, California which is on the immediate coast of Northern California. Although large numbers of other species of *Sonoma* have been collected by J. R. Helfer in his systematic sampling of this area, *S. spadica* is never represented by large series, suggesting a very specific habitat preference for this species. A disjunct but apparently conspecific population occurs inland and further to the south on the slopes of Mt. Saint Helena in Napa County. This population varies in having the frontal sulcus widened posteriorly, and the male aedeagi having a slightly longer lateral process on the median lobe.

Sonoma dolabra Marsh and Schuster, new species

(FIG. 4)

Male. Head 0.250 mm. long x 0.350 mm. wide; pronotum 0.370 mm. x 0.440 mm.; elytra 0.480 mm. x 0.610 mm.; abdomen 0.950 mm. x 0.635 mm.; total length 1.80 mm.

Brown. Head wider than long; eyes large but not prominent, of more than 20 facets, beginning at 4/10ths and ending at 7/10ths head length; median fovea extending almost to posterior margin of eyes (on slide-mounts to posterior margin of vertexal foveae); vertexal foveae separated by the distance from fovea to eye, located behind posterior margin of eyes; tempora rounded; setae directed toward center except behind eyes where they point towards the rear; mandibular rami with numerous small teeth. Pronotum wider than long, widest at middle, nearly straight to apical angle, arcuate to basal angle; disc not foveate; brachypterous. Elytra with 2 foveae on sutural stria, 3 on inner discal, 4 on outer. Abdomen with some long, recurved setae on all visible tergites and on all margins except the last. Metatrochanter with inner margin evenly rounded in outline. Metatibia not modified; apices of all tibiae with at least 1 large spine. Aedeagus as illustrated (Fig. 4).

Female unknown.

The holotype male was collected eighteen miles south of Klamath, Del Norte County, California by E. E. Gilbert and R. O. Schuster on September 19, 1953, and is deposited in the California Academy of Sciences.

This species is characterized primarily by the male genitalia. The right lateral lamina of the median lobe is strongly developed while the apical median process is greatly reduced as compared with *S. spadica*. The apical process of the left paramere is thickened into a partially lobed and club-shaped head. *Sonoma dolabra* externally shares the characters of the preceding species with but minor variations, such as the elytra being obviously longer than the pronotal width.

The paucity of material in view of extensive sampling to the south of Humboldt County, California suggests that the range of this species, unlike that of its allies which are found from Mendocino County south to Monterey County, extends north into Oregon.

Sonoma vanna Marsh and Schuster, new species

(FIG. 5)

Male. Head 0.238 mm. long x 0.312 mm. wide; pronotum 0.336 mm. x 0.377 mm.; elytra 0.377 mm. x 0.533 mm.; abdomen 0.698 mm. x 0.630 mm.; total length 1.68 mm.

Brown. Head wider than long; eyes large, not projecting beyond outline of head, of 18-20 facets; median fovea extending to middle of eyes (on slide-mounts beyond the posterior margin of vertexal foveae); vertexal foveae separated by the distance from fovea to eye, located behind posterior margin of eyes; tempora rounded. Pronotum wider than long, widest at middle, nearly straight to apical angle, arcuate to basal angle; disc not foveate; brachypterous. Elytra with 2 foveae on sutural stria, 1 or 2 on inner discal, and 3 or 4 on outer stria. Abdomen with some long, recurved setae on all visible tergites and on all margins except the last. Metatrochanter with inner margin evenly rounded in outline. Metatibia not modified; apices of all tibiae with at least 1 large spine. Aedeagus as illustrated (Fig. 5).

Female resembles the male except: eyes smaller, sixth sternite is simple, without a strong marginal arcuation, and the seventh sternite not capsulate.

The holotype male and two female paratypes were collected seven miles south of Big Sur, Monterey County, California by V. D. Roth on December 22, 1953. One male paratype was collected near Pt. Sur, Monterey County, California on May 31, 1954 by M. Wasbauer.

The holotype is deposited in the California Academy of Sciences, paratypes in the California Insect Survey, and in the collection of the authors.

Sonoma vanna is related to those three species previously described which comprise the group which are brachypterous and lack median pronotal foveae, secondary sexual modifications of the male metatibia, and a transverse strip of short matted setae on the first visible tergite. However, the males markedly differ in the configuration of the aedeagus. In this species the median lobe has developed into a thin fan-shaped structure with no obvious secondary processes. The apical median process is atrophied and bent to conform to the fan-shaped outline.

Thus far, this species has been collected only along the immediate coast to the south of Monterey Bay, California.

Sonoma isabellae (LeConte)

(FIGS. 6, 7)

Faronus isabellae LeConte, 1852, Ann. Lyceum Nat. Hist. New York, 5:215.

Sonoma isabellae Casey, 1887, Bull. California Acad. Sci., 2:195-196, 481-482; 89, Ann. New York Acad. Sci., 7:436.

Light brown. Head wider than long; eyes large, of about 40 facets, scarcely interrupting lateral outline, margin beginning at 2/5ths and ending at 4/5ths of head length; median fovea extending to the middle of eyes (on slide-mounts to the posterior margin of eyes); vertexal foveae on line with posterior margin of eyes; tempora rounded; setae directed to the rear, longer toward back of head; a single row of monaxial setae extend from side of neck to nearly the median line of the ventral surface of head; mandibular rami with about 12 small teeth. Pronotum wider than long, widest just before middle, feebly arcuate to apical and basal angles; median fovea just anterior to the basal-lateral foveae; antebasal sulcus extends posteriorly to 2 minute foveae, one near each baso-lateral fovea; discal foveae reduced or lacking; winged. Elytra with 2 foveae on sutural striae, 3 foveae on

inner discal stria and 2 on outer. Abdomen with long recurved setae on each visible tergite except the first, and one on each margin except the fourth; the narrow spongiose band of the first visible tergite barely interrupted medially; apex of the venter asymmetric; metatrochanter with inner margin subtruncate apically; metatibia without secondary tooth on inner margin; apex of each tibia with a small inner distal spine. Aedeagus as illustrated (Fig. 7).

Female resembles the male except: sixth sternite asymmetrically biarcuate, forming a blunt median cusp with the left arcuation deeper and more pronounced than the right.

Recorded distribution. LeConte (1852), "Sta. Isabel" (Santa Ysabel, San Diego County, California, type locality); Casey (1887), Alameda County, California; Bowman (1934), California.

New distribution. CALIFORNIA. Los Angeles County: Pasadena, 5 males, 3 females, A. Fenyés. San Diego County: Poway, 3 males, June 14, 1890, F. E. Blaisdell; Palm and Sheep Canyons, Borrego State Park, 23 males, 35 females, April 25, 1955, R. O. Schuster.

Sonoma isabellae resembles the preceding species by the absence of discal foveae on the pronotum and by the spinose projections on the inner distal surface of the male metatibia. It differs from these species in the reduced head size as compared with the pronotum and in the eyes which are about twice as large.

The elytra are nearly two times the pronotal length, the wings are fully developed, the sixth sternite of the female is asymmetrical, and a transverse pubescent strip occurs on the first visible tergite of both sexes.

This is the only species known to occur south of the Transverse Range in California where it occupies a variety of habitats from coastal plains and inner montane valleys to isolated canyons on the periphery of the Colorado Desert.

LeConte's original description, and the subsequent discussions and redescriptions of this species were based on coastal populations which are piceous with reddish elytra and appendages. However, populations from the desert slopes are pale, testaceous, and greatly resemble *S. corticina* and *S. cavifrons*. This bicolored condition led Casey to mention *S. isabellae*'s occurrence in the San Francisco Bay area, but the material he examined proved to be *S. spadica*.

Sonoma parviceps (Mäklin)

(FIG. 8)

Euplectus parviceps Mäklin, 1852, Bull. Soc. Nat. Moscou, 25:372.

Sonoma parviceps Casey, 1887, Bull. California Acad. Sci., 2:195-196.

Faronus parviceps Brendel, 1890, Bull. Univ. Iowa, p. 79.

Sagola parviceps Raffray, 1893, Rev. Ent., p. 30.

Sonoma parviceps Casey, 1893, Ann. New York Acad. Sci., 7:440-441.

Since the description of this species in 1852, a variety of citations as to its actual identity have been made without benefit of comparisons with the European type. In 1893, Casey examined in the LeConte collection a

male which is considered to be one of the original Frankenhauser types, and published a redescription. There are several specimens in the Casey collection labeled *S. parviceps*, presumably compared with the type in the LeConte collection. However, this material, collected by the Reverend Keene at Massett, Queen Charlotte Islands, British Columbia, Canada, represents two distinct species. In order to utilize this species in the pselaphid section of the *Beetles of the Pacific Northwest* edited by Melville Hatch, Dr. Park fixed the identity of *S. parviceps* by designation. The illustration of the male genitalia is included in this paper (Fig. 8).

When describing *S. cavifrons*, Casey indicated a close relationship with *S. parviceps* and this statement is further substantiated by a comparison of the aedeagi of these two species. The fundamental structure, unlike other allied species, is nearly identical, with specific character changes restricted to the distal one-third of the median lobe and to the number and configuration of the accessory processes on the parameres. *Sonoma parviceps* occurs from Alaska south into Washington and east into Idaho, while *Sonoma cavifrons* occurs from west central Oregon through north coastal California and south to beyond San Francisco Bay.

Sonoma cavifrons Casey

(FIG. 9)

Sonoma cavifrons Casey, 1887, Bull. California Acad. Sci., 2:481.

Sonoma longicollis Casey, 1893, Ann. New York Acad. Sci., 2:438-439.
[NEW SYNONYMY]

Sonoma subsimilis Casey, 1893, Ann. New York Acad. Sci., 2:439. [NEW SYNONYMY]

Male. Head 0.242 mm. long x 0.32 mm. wide; pronotum 0.323 mm. x 0.382 mm.; elytra 0.588 mm. x 0.590 mm.; abdomen 0.412 mm. x 0.573 mm.; total length 1.68 mm.

Red-brown. Vestiture mostly short but some longer marginal setae. Head wider than long; eyes large, fairly prominent, of about 35 facets, their front margin at 3/10ths and ending at 7/10ths head length; median fovea extends to 1/3rd length of eyes (on slide-mounts to 2/3rds); vertexal foveae separated by distance from fovea to eye, located on line with posterior margin of eyes; tempora gently rounded; a row of monaxial setae on neck; mandibular rami with numerous minute teeth. Pronotum wider than long; widest at middle, arcuate to both apical and basal angles; disc foveate; winged. Elytra with 3 or 4 foveae on sutural stria and each of the discal striae. Abdomen with long recurved setae on each visible tergite except the first and on each margin except the last. Metatrochanter with inner margin evenly rounded from base to apex; metatibia not modified; each tibia ending in a small inner spine. Aedeagus as illustrated (Fig. 9).

Female as in the male except: eyes reduced in size, sixth sternite with a left lateral comma-shaped notch in the margin.

Type locality. *S. cavifrons* Casey—Mendocino County, California in lit.; the neotype (USNM 38580)—Santa Clara County, California. *S. subsimilis* Casey—Sonoma County, California. *S. longicollis* Casey—Santa Cruz Mts., Santa Cruz County, California.

New distribution. OREGON. Linn County: Berlin, 1 female, March 23, 1954, V. D. Roth. Coos County: near Bridge, Oregon, 1 female, July 27, 1955, V. D. Roth. CALIFORNIA. Del Norte County: 18 miles south

of Klamath, 1 female, August 13, 1953, G. A. Marsh, R. O. Schuster; 2 males, September 19, 1953, E. E. Gilbert, R. O. Schuster. Humboldt County: 19 miles east of Green Point Ranch, 2 females, July 11, 1954, R. O. Schuster, E. E. Gilbert; Carlotta, 2 males, 1 female, October 1, 1959, V. D. Roth; 1 mile south of Dyerville, 1 female, September 19, 1953, E. E. Gilbert, R. O. Schuster. Mendocino County: Mendocino, 1 female, September 13, 1957, J. R. Helfer; Little River, 3 females, June 7, 1955, J. R. Helfer. Marin County: Samuel P. Taylor State Park, 1 male, February 3, 1958, J. R. Helfer; Drakes Bay, Point Reyes, 1 male, May 16, 1952, H. B. Leech; Muir Woods, 1 female, August 30, 1908, E. C. Van Dyke; Mount Tamalpais, 5 males, 4 females, October 5, 1958, F. C. Raney. Contra Costa County: Redwood Park, 1 female, June 28, 1953, E. E. Gilbert. San Mateo County, near Portola, 1 male, February 23, 1959, P. Arnaud.

Sonoma cavifrons is characterized by a well developed and elongate median fovea on the head, a foveate pronotal disc, and unmodified male metatibia. It is closely allied to *S. parviceps* from which it is separated geographically.

This species is also similar to *S. isabellae* and *S. corticina* but differs from the former by virtue of the foveate pronotal disc and from the latter by the deep median tentorial pits surrounded by numerous setae in the nuchal sulcus at the posterior ventral surface of the head.

The unique male types of *S. longicollis* and *S. subsimilis* are both identical with *S. cavifrons*.

Sonoma corticina Casey

(FIG. 10)

Sonoma corticina Casey, 1887, Bull. California Acad. Sci., 2:480 (female only).

Male. Head 0.213 mm. long x 0.287 mm. wide; pronotum 0.295 mm. x 0.328 mm.; elytra 0.492 mm. x 0.492 mm.; abdomen 0.517 mm. x 0.492 mm.; total length 1.55 mm.

Light brown. Head wider than long; eyes large, prominent, of about 40 facets, at about middle 1/3rd of head; median fovea small, not quite reaching front margin of eyes; vertexal foveae separated by distance from fovea to eye, located on line with posterior margin of eyes, tempora abruptly converging at nearly right angles to neck; two large partially coalesced densely setate cervico-gular pits present; mandibular rami with numerous denticulations. Pronotum wider than long, widest at middle, rounded to apical angle, arcuate to base, disc minutely foveate; winged. Elytral foveation obscure. Abdomen with spongiose band on first visible tergite. Metatrochanter with inner margin produced; metatibia weakly modified. Aedeagus as illustrated (Fig. 10).

Female as in the male except: eyes reduced, ventral concavity of the neck smaller, metatibial flange absent, sixth sternite with a median half circle projecting into what appears to be a spongy area of the seventh sternite.

Type locality. Soda Springs, Anderson Valley, Mendocino County, California (USNM 38575).

New distribution. OREGON: Coos County, near Bridge Camp, 1 female, July 28, 1954, V. D. Roth. CALIFORNIA: Mendocino County, Little River, 5 males, 3 females, August 18, 1957, 1 male, August 4, 1957, J. R.

Helfer. Marin County, 2 miles south of Olema, 1 male, November 1, 1953, R. O. Schuster; Mt. Tamalpais, 1 male, 2 females, October 5, 1958, F. C. Raney; Lagunitas, 1 female, March 9, 1913, F. E. Blaisdell; Samuel P. Taylor State Park, 2 males, 2 females, February 3, 1958, J. R. Helfer, South Park Entrance, 1 male, November 1, 1953, E. E. Gilbert, R. O. Schuster, V. D. Roth.

S. corticina is related to that group of species which is relatively small, lack or have ill defined discal foveae on the pronotum, have a fine pubescent line on the first visible abdominal tergite, and have an atrophied or no spine on the inner distal margin of the metatibia. It is further characterized by having an abruptly rounded-angulate tempora and two deep approximate tentorial pits at the ventral base of the head which are surrounded by numerous setae.

The male genitalia are considered as the most divergent type when compared with the fundamental pattern. The setation on the parameres is greatly reduced and the two conical projections of the right lobe are heavily tuberculate as in *S. margemina* from the Pacific Northwest.

The type described by Casey was a female which accounts for certain discrepancies between his description and the above which is taken from the male.

Sonoma margemina Park and Wagner

(FIG. 11)

Sonoma margemina Park and Wagner, 1961, Univ. Washington Publ. Biol. 16:6.

Male. Head 0.320 mm. long x 0.338 mm. wide; pronotum 0.412 mm. x 0.445 mm.; elytra 0.742 mm. x 0.684 mm.; abdomen 0.760 mm. x 0.742 mm.; total length 2.23 mm.

Brown. Head wider than long; eyes large, prominent, of 35 to 40 facets, at about middle 1/3rd of head; median sulcus well developed, deep, obtriangular; vertexal foveae separated by distance from fovea to eye, located on a line with posterior margin of eyes; tempora rounded angulate to neck; cervico-gular pit obsolete; mandibular rami with small teeth. Pronotum wider than long, widest at middle, rounded to apical angle, arcuate to base; disc with 2 small median foveae; winged. Elytra nearly 2 times longer than pronotum. Abdomen with transverse, spongy pubescent band on first visible tergite, medianly interrupted. Metatrochanter with inner margin produced medianly; metatibia weakly modified with spine. Aedeagus as illustrated (Fig. 11).

Type locality. Peavine Ridge near McMinnville, Yamhill County, Oregon.

Female unknown.

New distribution. CANADA. Massett, Queen Charlotte Island, British Columbia, 2 males, Reverend Keene. WASHINGTON. Kittitas County: Easton, 1 male, A. Koebele.

There is an interesting relationship between this species and *S. corticina* in that only these two species have tuberculate processes arising from the parameres of the male genitalia. Further similarities are evident in the rounded-angulate condition of the tempora and the presence of a weak metatibial spine on males. The metatibial spine is, however,

closer to the tibial apex than in *S. corticina*. It can be separated from this species by its much larger size, absence of foveae or excess setation on the ventral surface of the head, a more elongate median cephalic sulcus, and the absence of setae and abundance of tuberculate spines on the parameres of the male genitalia. With more intensive collecting in the Pacific Northwestern states and British Columbia, this species should prove to be very widespread within and west of the Cascades. It already occurs in three widely separated areas in this region.

Sonoma triloba Marsh and Schuster, new species

(FIG. 12)

Male. Head 0.240 mm. long x 0.320 mm. wide; pronotum 0.330 mm. x 0.380 mm.; elytra 0.492 mm. x 0.573 mm.; abdomen 0.631 mm. x 0.574 mm.; total length 1.75 mm.

Brown. Vestiture mostly short but some longer, marginal setae. Head wider than long; eyes moderately large, the margins beginning before 2/5ths and ending slightly past 3/5ths head length; median fovea extending past front margin of eyes (on slide-mounts to nearly middle of eyes); vertexal foveae large, separated by distinctly less than the distance from fovea to eye; tempora rounded; a single row of monaxial setae extend from side of neck to nearly the middle of the ventral surface of head; mandibular rami with about 15 minute denticulations. Prothorax wider than long, widest through middle; arcuate to apical and basal angles; disc foveate; winged. Elytra with 4 or 5 foveae on discal stria; 3 on inner discal stria and 2 or 3 on the outer. Abdomen with long recurved setae on each visible tergite except the first, and on each margin except the last; the narrow spongiose band on the first visible tergite is interrupted at center; sternites 2 through 5 with a fovea at each anterior-lateral margin; apex of venter of usual asymmetric nature; metatrochanter with inner margin evenly rounded from base to apex; metatibia not modified; spine of inner distal apex reduced or absent. Aedeagus as illustrated (Fig. 12).

Female unknown.

The holotype male was collected at Fort Bragg, Mendocino County, California on December 24, 1954 by J. R. Helfer. It is deposited in the California Academy of Sciences. A male and female paratype were collected at Caspar, Mendocino County, California on March 7, 1954 by J. R. Helfer, and they are retained by the authors.

This species is allied to *S. cuneata* by virtue of its comparable external morphology and the configuration of the male genitalia. Each species shares the reduced setation and general accessory armatured condition of the parameres. However, the median lobe of *S. triloba* is fully three times longer than broad whereas it is just slightly longer than broad in *S. cuneata*.

This species is presently known to occur only in two approximate areas on the central Mendocino County coast despite intensive sampling of the north coast ranges from the Oregon border south to San Francisco Bay.

Sonoma cuneata Marsh and Schuster, new species

(FIGS. 13, 23)

Male. Head 0.246 mm. long x 0.361 mm. wide; pronotum 0.410 mm. x 0.470 mm.; elytra 0.608 mm. x 0.622 mm.; abdomen 0.657 mm. x 0.657 mm.; total length 2.00 mm.

Brown. Head wider than long; eyes moderate in size and prominence, margin beginning at 3/10ths and ending at 6/10ths head length; median fovea small, extending slightly past the front margin of eyes (on slide-mounts to anterior 1/3rd); vertexal foveae small, separated by a distance slightly greater than that from fovea to eye; tempora rounded angulate; a single row of monaxial setae extend from the side of the neck to nearly the median line of ventral surface of head; mandibular rami with about 15 minute teeth. Prothorax wider than long, widest just before the middle; arcuate to apical and basal angles; front and rear margins sinuate; discal foveae minute. Elytral foveae variable; winged. Abdomen with long recurved setae on each visible tergite except the first and 1 on each margin except the fourth. The first visible tergite with a spongiose strip interrupted at middle; apex of venter of usual asymmetric nature; metatrochanter small, inner margin evenly rounded; metatibia with modification at distal 1/3rd (Fig. 23); apexes of tibia with small inner spine. Aedeagus as illustrated (Fig. 13).

Female unknown.

The holotype male and two male paratypes were collected two miles north of Fort Dick, Del Norte County, California on November 21, 1953 by V. D. Roth. One male paratype was collected at Freshwater, Humboldt County, California, August 18, 1953 by G. A. Marsh and R. O. Schuster.

The holotype is deposited in the California Academy of Sciences, the paratypes in the California Insect Survey collection and in the collection of the authors.

The males of this species are distinct only on the basis of the aedeagi. The configuration of the median lobe, while unique, indicates a morphological similarity to both *S. triloba* and *S. humilis*. External characters alone are not sufficient to separate *S. cuneata*. Their distributions are not known to overlap.

Females, although collected with the type series, have not been positively associated with the males because additional specimens of both sexes representing two other species occurred in the same samples.

Sonoma grandiceps Casey

(FIG. 14)

Sonoma grandiceps Casey, 1893, Ann. New York Acad. Sci., 7:437-438.

At present, this species is known only from the type series which was collected in Santa Cruz County, California. On the basis of Casey's original description this species falls within that group of species having large eyes, a bifoveate pronotal disc and a transverse pubescent line near the caudal margin of the first visible dorsal abdominal segment. Examination of the aedeagus further substantiates its relationship with *S. rubida*, *S. triloba*, and *S. cuneata* in that all these species have well developed median lobes and reduced setation on the parameres as well as heavy, though relatively simple, accessory projections.

Two unique characters noted by Casey and observed by the senior author are the lateral setate cusps on the fifth sternite of the male and the small deflexed median cusp on the posterior margin of the penultimate segment of the female.

Sonoma humilis Marsh and Schuster, new species

(FIGS. 15, 22)

Male. Head 0.287 mm. long x 0.355 mm. wide; pronotum 0.360 mm. x 0.460 mm.; elytra 0.680 mm. x 0.657 mm.; abdomen 0.820 mm. x 0.705 mm.; total length 2.13 mm.

Brown. Vestiture mostly short, some long recurved marginal setae. Head wider than long; eyes large, somewhat prominent, beginning at 3/10th and ending at 7/10ths head length; median fovea short, extending but slightly past front margin of eyes (on slide-mounts to middle of eyes); vertexal foveae separated by distance from fovea to eye; tempora rounded, the curve more pronounced toward cervix; a single row of monaxial setae extends from side of cervix to nearly the median line of the ventral surface of head; mandibular rami with about 20 small teeth. Prothorax wider than long, widest at middle, arcuate to both apical and basal angles; foveae and sulcus as usual; discal punctures present; winged. Elytra with 4 foveae on sutural stria, 3 on inner discal stria, 3 or 4 on the outer. Abdomen with normal setation; spongiose strip of first visible terigite present; metatibia with a simple tumosity about 1/3rd from the apex; inner distal apex of each tibia with a small spine (Fig. 22). Aedeagus as illustrated (Fig. 15).

Female resembles the male except: the metatibia is simple and the sixth and seventh sternites are as in *S. corticina* with an atrophied median cusp which is not obviously attached to the margin of the sixth sternite.

The holotype male, 3 male and 2 female paratypes were collected at Little River, Mendocino County, California on June 7, 1955 by J. R. Helfer. A male and a female paratype from the same locality were collected by J. R. Helfer on May 3, 1955. Twenty-four additional paratypes were collected by J. R. Helfer in Mendocino County, California at Mendocino, Comptche, Casper, Ft. Bragg, and the Pigmy Forest.

Other specimens not included in the type series were collected as follows: CALIFORNIA: Del Norte County: six miles east of Crescent City, 1 male, July 10, 1958, J. Powell. Humboldt County: 9 miles east of Carlotta, 1 female, October 1, 1959, V. D. Roth; one mile south of Dyerville, 1 male, 1 female, September 19, 1953, E. E. Gilbert, R. O. Schuster; 14 miles east of Green Point Ranch, 3 females, July 11, 1954, E. E. Gilbert, R. O. Schuster. Mendocino County: Talmadge, 1 male, July 29, 1959, R. O. Schuster, L. M. Smith. Sonoma County: Rhododendron State Park, 1 female, October 9, 1954, C. D. MacNeill, R. O. Schuster; Mark West Springs, 1 male, December 31, 1953, G. A. Marsh, R. O. Schuster; Mark West Reservoir, 1 male, January 22, 1958, R. O. Schuster. Napa County: 7 miles east of Rutherford, 1 male, January 6, 1957, R. O. Schuster; Oakville, 1 male, 3 females, March 14, 1954, J. R. Helfer; 7 miles west of Oakville, 1 female, March 15, 1954, G. A. Marsh, R. O. Schuster. Marin County: Corte Madera, 1 female, October 16, 1954, J. R. Helfer; Mt. Tamalpais, 2 males, 2 females, October 5, 1958, F. C. Raney; Muir Woods, 1 male, July 30, 1908, E. C. Van Dyke; Boot Jack Canyon, Muir Woods, 1 male, May 21, 1952, H. S. Dybas; Samuel P. Taylor State Park, 1 female, October 24, 1953, V. D. Roth, 1 male, December 6, 1958, C. W. O'Brian. Alameda County: Oakland Hills, 1 female, January 15, 1947, K. S. Hagen; Oakland, 1 male, 2 females, December 12, 1953, J. R. Helfer, 2 females, February 5, 1953, R. O. Schuster. Contra Costa County: Redwood Peak, Oakland Hills, 1 female, January 9, 1954, R. O. Schuster, G. A. Marsh; Redwood Park, 2 males, 1 female, May 18, 1953, E. E. Gilbert, R. O. Schuster, 1 male, May 12, 1953, E. E. Gilbert.

The holotype male and a female paratype are deposited in the California Academy of Sciences. Other paratypes to be distributed to the California Insect Survey collection, the collection of Orlando Park and the collection of the authors.

This species, while closely related to *S. rubida*, differs markedly in the shape of the male genitalia and the last three sternites of the female. It is perhaps the most widely distributed species in California, extending along the north coast range from Humboldt to Marin Counties. It is the only species other than *S. cavifrons* which occurs in those countries immediately east of San Francisco Bay. Because of its wide range it is commonly associated with many other species of the genus.

Sonoma rubida Casey

(FIG. 16)

Sonoma rubida Casey, 1893, Ann. New York Acad. Sci., 7:437-438.

Male. Head 0.275 mm. long x 0.360 mm. wide; pronotum 0.385 mm. x 0.480 mm.; elytra 0.680 mm. x 0.680 mm.; abdomen 0.738 mm. x 0.680 mm.; total length 2.10 mm.

Brown. Vestiture mostly short, some longer recurved marginal setae. Head wider than long; eyes large, somewhat prominent, margins beginning at 3/10ths and ending at 7/10ths head length; median fovea extending to anterior third of eyes (on slide-mounts to posterior third); vertexal foveae separated by distance subequal to that between fovea and eye, located slightly posterior to rear margin of eyes; a single row of monaxial setae extends from side of neck to nearly the median line of ventral surface of head. Prothorax wider than long, widest through middle, weakly arcuate to apical angle, strongly arcuate to basal angle; fovea and sulcus of base normal; discal foveae present. Elytra with 3 foveae on inner stria, 3 or 4 on outer; winged. Abdomen with spongiose strip on first visible tergite; apex of venter of usual asymmetric nature; metatrochanter triangular, inner margin nearly straight; metatibia with projection at distal third; projection rounded basally, pointed apically; apex of each tibia ending with a small spine. Aedeagus as illustrated (Fig. 16).

Female resembles the male except: metatrochanter and metatibia simple. Sixth abdominal sternite asymmetrically biarcuate with small caudally elevated median process which does not attain the margin of the terminal segment.

Type locality. Santa Cruz Mts., Santa Cruz County, California.

New distribution. CALIFORNIA. San Mateo County: 6 miles southeast of Half Moon Bay, 1 female, December 23, 1953, V. D. Roth; 5 females, June 1, 1957, R. O. Schuster; King Mt., 7 males, 1 female, September 1, 1958, R. O. Schuster. Santa Cruz County: Santa Cruz Mts., 2 males, 5 females, A. Koebele; Big Basin, 1 male, 4 females, December 23, 1953, V. D. Roth; Boulder Creek, 1 female, December 23, 1953, V. D. Roth. Santa Clara County: Stevens Creek Reservoir, 1 female, February 15, 1953, D. J. Burdick. Monterey County: Carmel, 2 females, December 22, 1953, V. D. Roth.

Sonoma rubida is closely related to *S. humilis* and presumably is geographically isolated. Both species are large with well developed eyes and a deep triangular frontal fovea which extends internally between the eyes. The metatrochanter is not modified in either species and both have strongly produced laminated spines on the inner distal surface of the metatibia.

They differ primarily on the basis of the male genitalia and the last three sternites of the female. *Sonoma grandiceps*, which occurs within the range of this species, can be differentiated by its smaller size, two lateral setate cusps on the fifth sternite of the male and the configuration of the male genitalia. The female has an elongate median cusp on the penultimate sternite, whereas the female of *S. rubida* has a short oblique median ridge or process directed caudally.

Sonoma dilopha Marsh and Schuster, new species

(FIG. 17)

Male. Head 0.320 mm. long x 0.40 mm. wide; pronotum 0.455 mm. x 0.565 mm.; elytra 0.760 mm. x 0.820 mm.; abdomen 0.784 mm. x 0.658 mm.; total length 2.40 mm.

Brown. Vestiture mostly short but some longer marginal setae. Head wider than long; eyes large, prominent; margins from 3/10ths to 7/10ths head length; median fovea ending behind front margin of eyes (on slide-mounts nearly to middle of eyes); vertexal foveae separated by approximately the distance from fovea to eye, located at posterior margin of eyes; tempora rounded; a single row of monaxial setae on side and venter of neck; inner rami of mandible crenulate. Pronotum widest through middle, arcuate to apical and basal angles; disc foveate. Elytral foveae pattern variable; winged, 1.25 mm. Abdomen with long recurved setae on each visible tergite except the first and on each margin except the last; the narrow spongiose band of the first visible tergite barely interrupted at the middle; metatrochanter expanded, inner margin deeply rounded; metatibia with a projection at the inner distal fourth; apices of all tibia with a small spine. Aedeagus as illustrated (Fig. 17).

Female unknown.

The holotype male was collected fourteen miles east of Blue Lake, Humboldt County, California, by E. E. Gilbert and R. O. Schuster on September 19, 1953, and is deposited in the California Academy of Sciences.

This species would appear to be closely allied to *S. hespera* because of the comparable size and the shortened wings. It shares other characters, such as the reduced median fovea of the head, with *S. priocera*, and the well developed modification of the male metatibia with *S. rubida*. The aedeagus is so modified that it superficially resembles that of the related genus *Megarafonus*.

Sonoma hespera Park and Wagner

(FIG. 18)

Sonoma hespera Park and Wagner, 1961, Univ. Washington Publ. Biol. 16:6.

Male. Head 0.310 mm. long x 0.385 mm. wide; pronotum 0.420 mm. x 0.495 mm.; elytra 0.730 mm. x 0.622 mm.; abdomen 0.738 mm. x 0.738 mm.; total length 2.45 mm.

Brown. Vestiture mostly short but some longer marginal setae. Head wider than long; eyes large, front margin 3/10ths head length, rear margin 7/10ths head length; median fovea narrowly elongate, extending to middle of eyes (on slide-mounts to posterior third of eyes); vertexal foveae separated by distance from fovea to eye, located on a line with rear margin of eyes; a single row of monaxial setae on neck; inner rami of mandibles with numerous small teeth. Prothorax wider than long;

widest just before the middle; weakly arcuate to apical and basal angles; discal foveae obsolete; wing short but not as brachypterous as in *S. spadica*. Elytral foveation variable. Abdomen with long recurved setae on each visible tergite except the first and 1 on each margin except the fourth; narrow spongiose strip of first visible tergite interrupted medially; sternites 2 through 5 with a fovea at each anterior-lateral margin; metatrochanter with short blunt spine at inner distal fourth; apex of each tibia with an inner spine. Aedeagus as illustrated (Fig. 18).

Type locality. Boyer, Polk County, Oregon.

New distribution. OREGON. Linn County: 10 miles southeast of Detroit, 1 male, March 14, 1954, V. D. Roth. Douglas County: Loon Lake, 1 male, 2 females, July 1, 1959, L. M. Smith. Coos County: near Bridge, 1 male, July 28, 1954, V. D. Roth. CALIFORNIA. Del Norte County: 2 miles north of Ft. Dick, 2 females, November 21, 1953, V. D. Roth; 18 miles south of Klamath, 1 male, September 19, 1953, E. E. Gilbert, R. O. Schuster.

This species, recently described by Park and Wagner, is closely related to *S. priocera*. It differs on the basis of the aedeagus which is more complex than in any known species of *Sonoma*. The median fovea of the head is well developed, expanded apically then narrowly constricted as it extends to the middle of the eyes. The elytra are obviously more than twice the length of the head, and the male metatibial spine is well developed and strongly produced.

Because of insufficient samples from the Pacific Northwest, the few records which exist do not provide an adequate basis for conclusive distributional analysis. However, it would appear that the extreme northern portions of California represent the southern periphery of the range of this species and that it may be expected to occur widely in Oregon east to the Cascades and into Washington.

Sonoma priocera Marsh and Schuster, new species

(FIG. 19)

Male. Head 0.280 mm. long x 0.350 mm. wide; pronotum 0.375 mm. x 0.460 mm.; elytra 0.590 mm. x 0.615 mm.; abdomen 0.886 mm. x 0.662 mm.; total length 2.10 mm.

Brown. Vestiture mostly short but some longer marginal setae. Head wider than long; eyes large, prominent; median fovea small, subtriangular terminating just behind the front margin of eyes (on slide-mounts, near middle of eyes); vertexal foveae separated approximately by the distance from fovea to eye, located at posterior margin of eyes; tempora weakly rounded to subtruncate basal lateral angle; a single row of monaxial setae on side and venter of neck. Prothorax widest through middle, rounded to apical angle, weakly arcuate to basal angles; disc foveate; winged. Elytral foveae pattern variable. Abdomen with long recurved setae on each visible tergite except the first and on each margin except the last; the narrow spongiose band of the first visible tergite barely interrupted at the middle; metatrochanter with inner margin depressed medially, not evenly rounded; metatibia with a projection at the inner distal 1/10th, just superior to apical spine by length of spine. Aedeagus as illustrated (Fig. 19).

Female unknown.

The holotype male and one male paratype were collected at Berlin, Linn County, Oregon on March 23, 1954, by V. D. Roth. The holotype is deposited in the California Academy of Sciences, the paratype in the collection of the authors.

This species shares a number of characters with *S. hespera*. One unique structure to be found only in these two species is the thin, obliquely transverse, marginally serrate lamina of the aedeagus. However, *S. priocera* differs in the reduction or absence of processes on the lateral parameres. Also, the median fovea of the head is reduced to a small subtriangular foramen. The head is just subequal in length to the elytra, and the male metatibial spine is reduced to an abortive spur evident only on slide mounts.

This species is presently known only from the type locality which is in the southern portion of the Willamette Valley in Oregon.

Sonoma tolulae (LeConte)

(FIG. 20)

Faronus tolulae LeConte, 1850, Boston J. Nat. Hist., 6:108-109; 1852, Ann. Lyceum Nat. Hist., 5:215.

Rafonus tolulae Casey, 1893, Ann. New York Acad. Sci., 7:441-442.

Sonoma tolulae Raffray, 1903, Ann. Ent. Soc. France, 72:484-604.

Male. Total length 2.1 mm.

Dark brown, shining, antenna and legs light reddish yellow. Vestiture long, coarse. Head with median fovea broad at apex, narrowing posteriorly between eyes, not attaining vertexal foveae; tempora rounded. Pronotum nearly as long as wide; discal foveae reduced or absent; winged. Elytra short as in *S. repanda*. Abdomen with first visible tergite simple, lacking transverse spongiose strip of setae. Meta-trochanter evenly rounded in outline. Metatibia simple, not modified on ventral surface. Aedeagus as illustrated (Fig. 20).

Recorded distribution. LeConte (1850), "cataractam Georgiae" (northern Georgia; type locality), Brendel and Wickham (1890), Virginia; Casey (1893), Georgia and Pennsylvania (St. Vincent, Pennsylvania).

New distribution. Black Mountain, Buncombe County, North Carolina.

At present, this is the only species occurring in the eastern United States. Although originally described in a different genus, there is no question that this species belongs in the genus *Sonoma* as indicated by other authors. The short elytra and simple first visible abdominal tergite are characteristic of *S. repanda* and its allies. However, *S. tolulae* is considerably larger than the four species of this group and the male aedeagus more closely approximates that of *S. isabellae*.

Sonoma olycalida Park and Wagner

(FIG. 21)

Sonoma olycalida Park and Wagner, 1961, Univ. Washington Publ. Biol. 16:6.

Male. 2.0 mm. long x 0.6 mm. wide.

The manuscript description and genitalic illustration of this species were made available for inclusion in this revision through the kindness of Orlando Park. On the basis of general facies and characters such as the secondary sexual modifications of the male metatibia, this species is

closely allied to *S. cuneata* and *S. humilis*. Moreover, the male aedeagus shares numerous common points of reference with these two species.

The unique male was collected in northwestern Washington at Olympic Hot Springs, Olympic National Park.

KEY TO MALES OF SONOMA

- | | | |
|---------|---|----|
| 1. | Pronotum with discal foveae absent or reduced----- | 2 |
| | Pronotum with two distinct discal foveae----- | 9 |
| 2(1). | Vestiture sparse, fine; wings atrophied; aedeagus with apices of parameres densely setate (Figs. 2-5); California----- | 3 |
| | Vestiture coarse, not sparse; wings well developed; aedeagus with four or five subapical setae on parameres (Fig. 20); Atlantic Coast States----- | |
| | -----SONOMA TOLULAE (LeConte) | |
| 3(2). | Elytra shorter than pronotal width----- | 4 |
| | Elytra equal to, or longer than, pronotal width----- | 5 |
| 4(3). | Median terminal process of aedeagus strongly contorted, without additional small processes or laminae (Fig. 2)-----SONOMA REPANDA, new species | |
| | Median terminal process of aedeagus terminating in smaller, tubular sigmoid process (Fig. 3)-----SONOMA SPADICA, new species | |
| 5(3). | First visible tergite without transverse strip of fine pubescence (Fig. 1)----- | 6 |
| | First visible tergite with transverse strip of fine pubescence (Fig. 6)----- | 7 |
| 6(5). | Median terminal process of aedeagus asymmetrically trifid (Fig. 4)----- | |
| | -----SONOMA DOLABRA, new species | |
| | Median terminal process of aedeagus asymmetrically expanded into thin, fan-shaped lamina incised at upper left margin (Fig. 5)-----SONOMA VANNA, new species | |
| 7(5). | Metatibia with modification of inner distal surface----- | 8 |
| | Metatibia without modification of inner distal surface----SONOMA ISABELLAE (LeConte) | |
| 8(7). | Metatibia with carinoid process at inner distal one-third (Fig. 23); metatrochanter small, evenly rounded in outline; aedeagus with subtruncate, laminate median process (Fig. 13)-----SONOMA CUNEATA, new species | |
| | Metatibia with short, blunt spine at inner distal one-fourth; metatrochanter broadly convex to subtruncate mesially; aedeagus with median process obliquely inclined, partially trough-like with rounded apex (Fig. 18)--SONOMA HESPERA Park and Wagner | |
| 9(1). | Fifth sternite with two lateral setate cusps; aedeagus with median process subapically constricted and obliquely bent; parameres nearly symmetrical with two superior elongate processes and three setae each (Fig. 14)--SONOMA GRANDICEPS Casey | |
| | Fifth sternite simple; aedeagus variable but parameres distinctly asymmetrical ---- | 10 |
| 10(9). | Metatibia without modification of inner distal surface----- | 11 |
| | Metatibia with modification of inner distal surface----- | 13 |
| 11(10). | Parameres of aedeagus with dense brushes of long setae, mesial margins produced as thin laminae partially enclosing erect median lobe----- | 12 |
| | Parameres of aedeagus with five or six long apical setae, not contiguous and each bearing a projection as broad as the apex of the median lobe (Fig. 12)----- | |
| | -----SONOMA TRILOBA, new species | |
| 12(11). | Median lobe of aedeagus with apex enlarged and directed sharply to left (Fig. 8)-- | |
| | -----SONOMA PARVICEPS (Maklin) | |
| | Median lobe of aedeagus nearly straight and of more uniform width (Fig. 9) ---- | |
| | -----SONOMA CAVIFRONS Casey | |
| 13(10). | One or both parameres of aedeagus with apical conic projections bearing numerous granulo-tuberculations (Figs. 10 & 11)----- | 14 |
| | Parameres variously modified or sculptured but without granulo-tuberculate projections ----- | 15 |
| 14(13). | Head with two large partially coalesced, densely setate cervico-gular foveae; tempora abruptly converging to neck; metatibia with weak inner distal spine; only one paramere of aedeagus with tuberculate projections (Fig. 10)----- | |
| | -----SONOMA CORTICINA Casey | |
| | Head with cervico-gular fovea not as above; tempora rounded to neck; metatibia with | |

- weak spine near apex; both parameres of aedeagus with tuberculate projections (Fig. 11) -----SONOMA MARGEMINA Park and Wagner
- 15(3). Both parameres of aedeagus with elongate apices or supplementary projections---- 16
One paramere of aedeagus lacking supplementary projections (Fig. 19)-----
-----SONOMA PRIOCERA, new species
- 16(15). Median lobe of aedeagus narrowed and evenly rounded or acuminate apically (Figs. 15, 16) ----- 17
Median lobe of aedeagus broad and produced laterally at apex----- 18
- 17(16). Aedeagus with projections of parameres broad, laminate (Fig. 15)-----
-----SONOMA HUMILIS, new species
Aedeagus with projections of parameres narrow, one recurved to form crook (Fig. 16) -----SONOMA RUBIDA Casey
- 18(16). Aedeagus with median lobe laterally produced at apex; parameres apically elongated (Fig. 17) -----SONOMA DILOPHA, new species
Aedeagus with median lobe subapically constricted, apex narrower than base; parameres not produced at apex (Fig. 21)-----SONOMA OLYCALIDA Park and Wagner

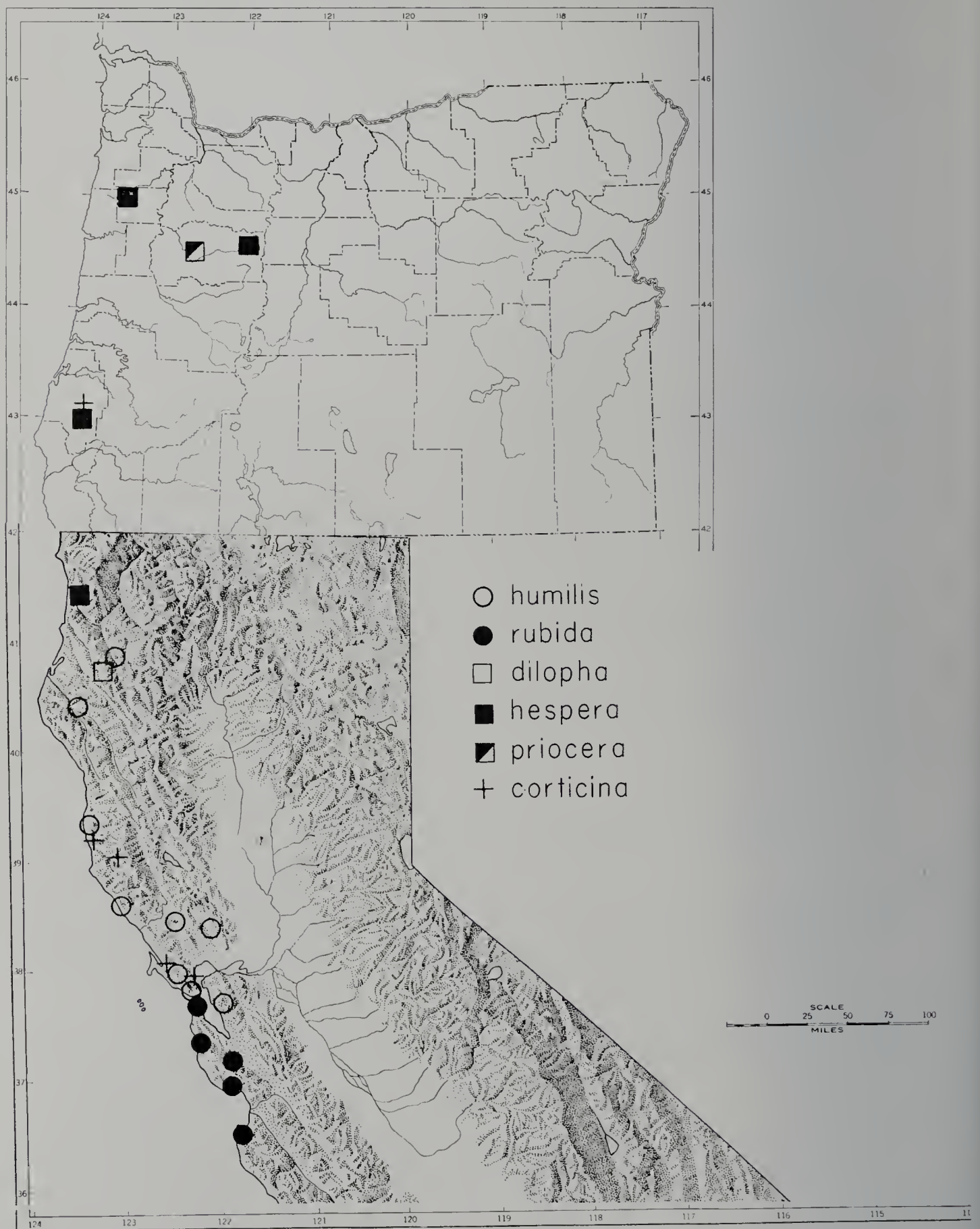
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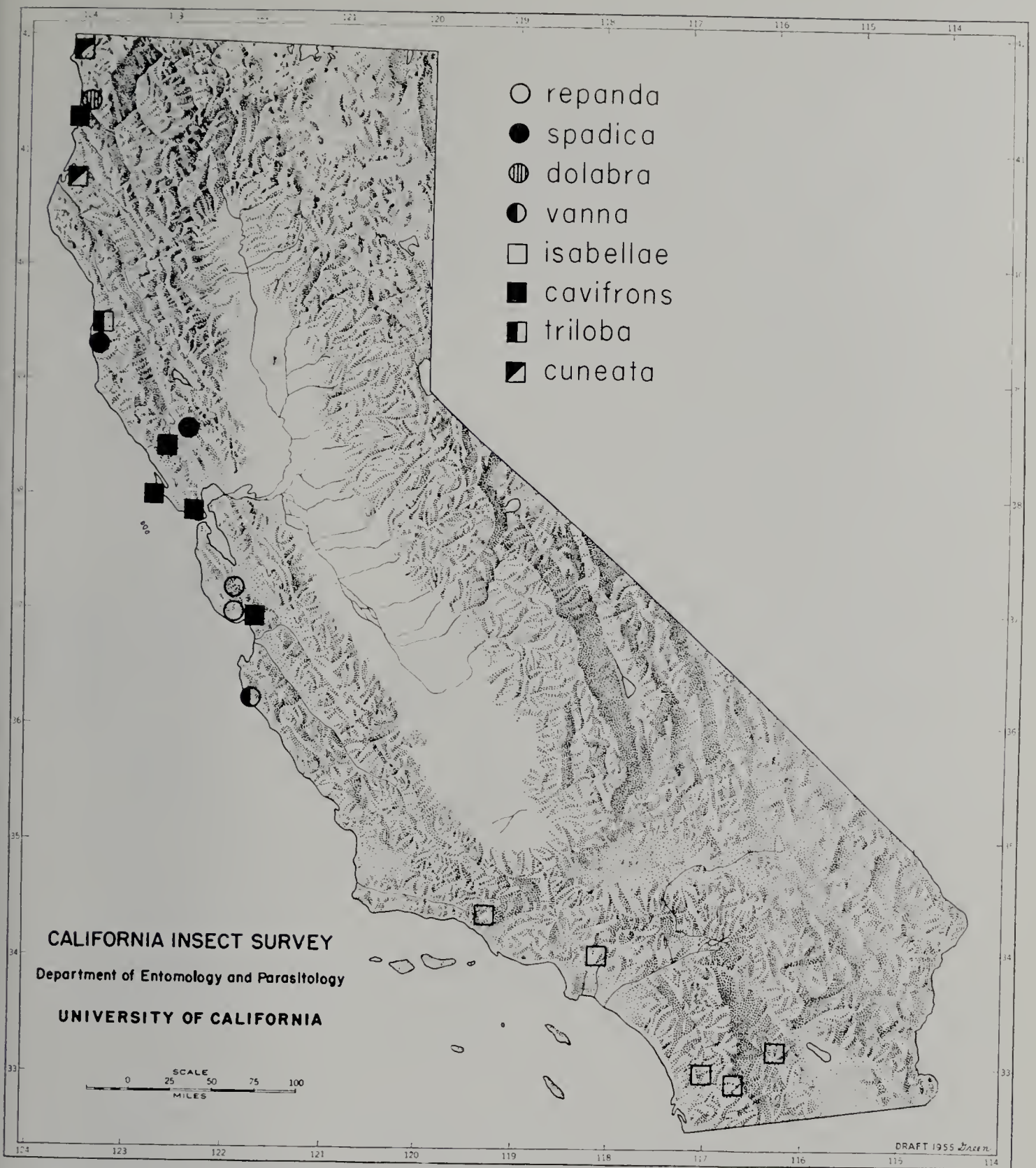
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Distribution map of six species of *Sonoma*.



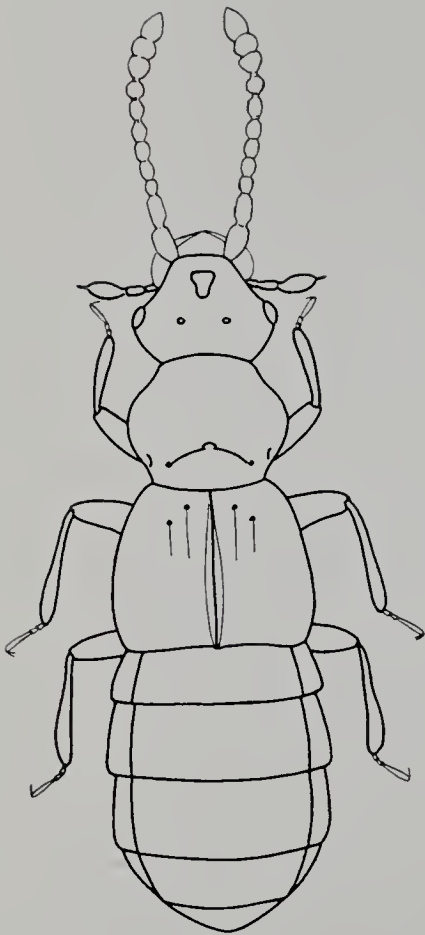
Distribution map of eight species of *Sonoma*.

Explanation for illustrations on following three pages:

FIGURES 1, 6—Dorsal aspect of entire specimens. FIGS. 2-5, 7—Dorsal aspect of aedeagi.

FIGURES 8-14—Dorsal aspect of aedeagi.

FIGURES 15-21—Dorsal aspect of aedeagi. FIGS. 22, 23—Male metatibiae.



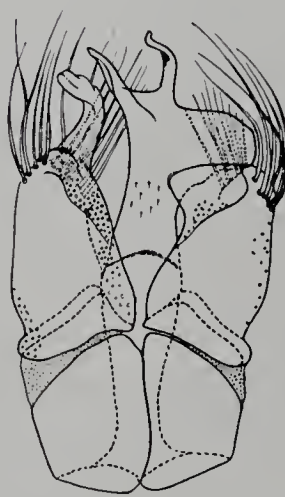
1 repanda



2 repanda



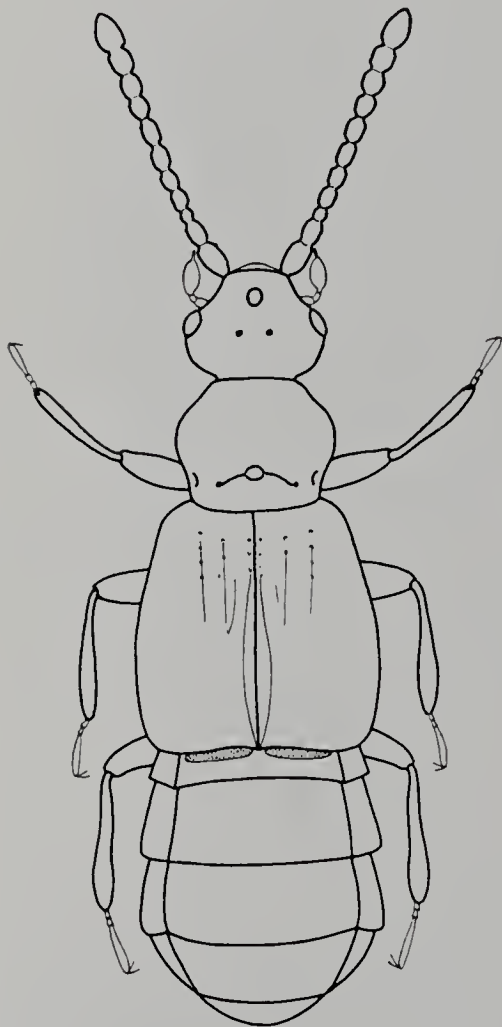
3 spadica



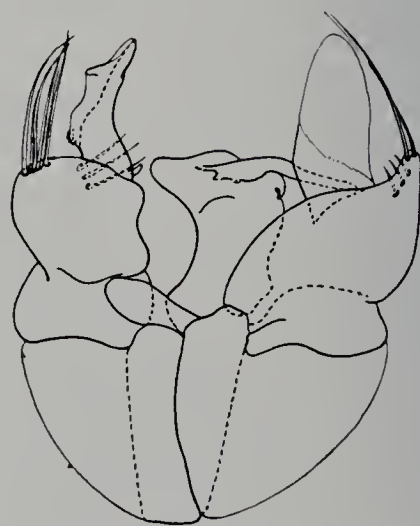
4 dolabra



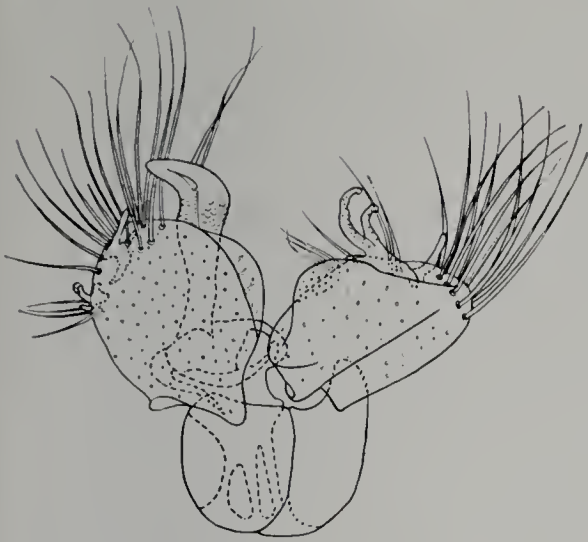
5 vanna



6 isabellae



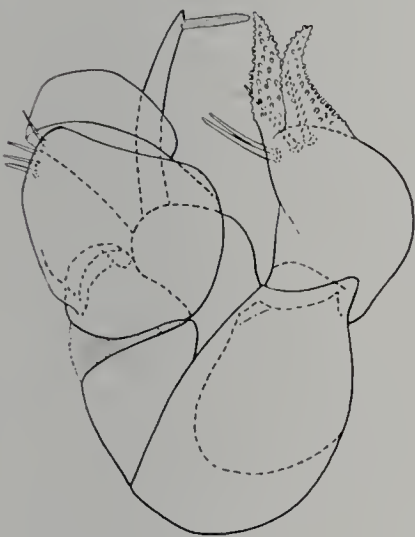
7 isabellae



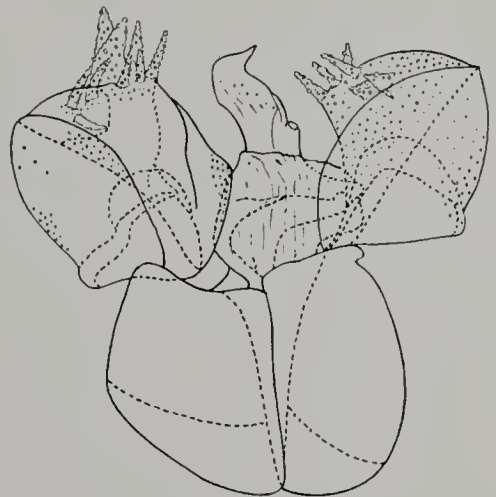
8 parviceps



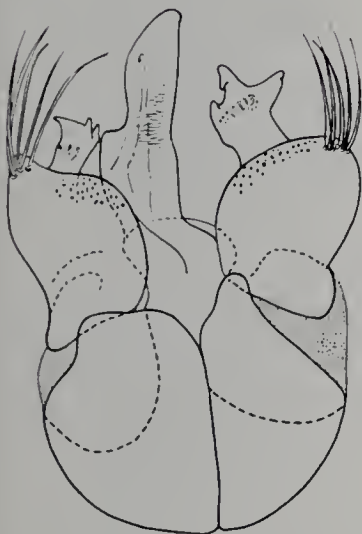
9 cavifrons



10 corticina



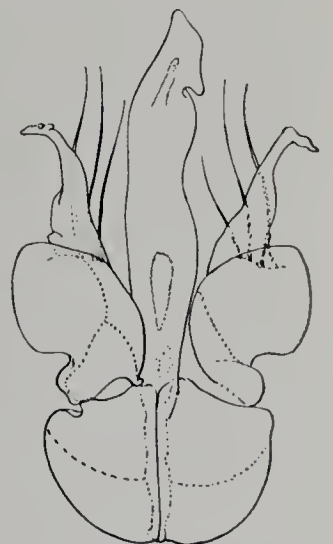
11 margemina



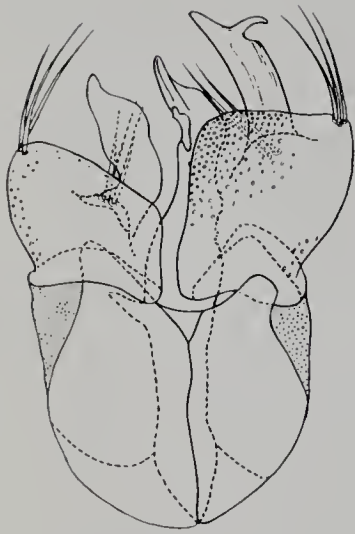
12 triloba



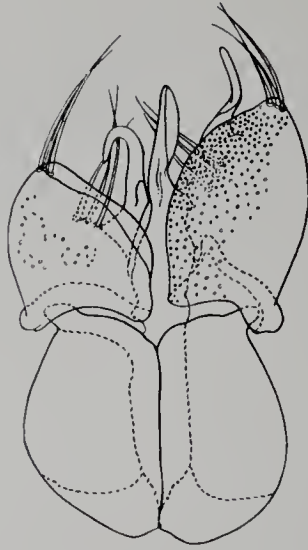
13 cuneata



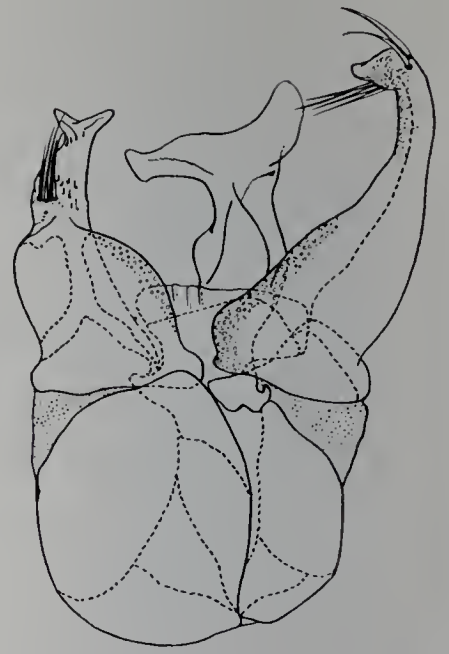
14 grandiceps



15 humilis



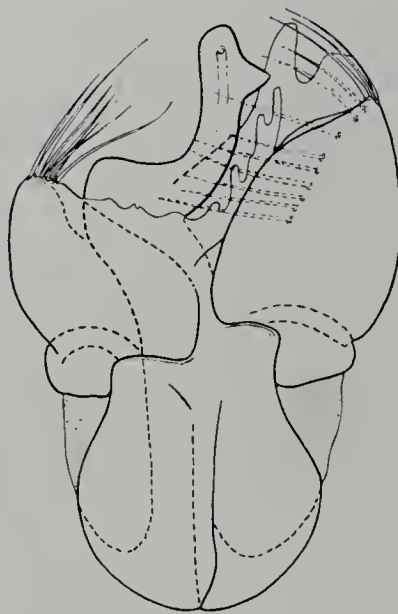
16 rubida



17 dilopha



18 hespera



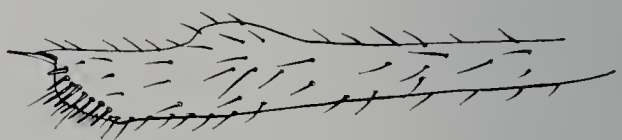
19 priocera



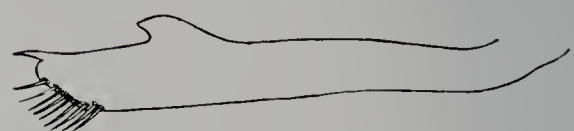
20 tolulae



21 olycalida



22 humilis



23 cuneata